

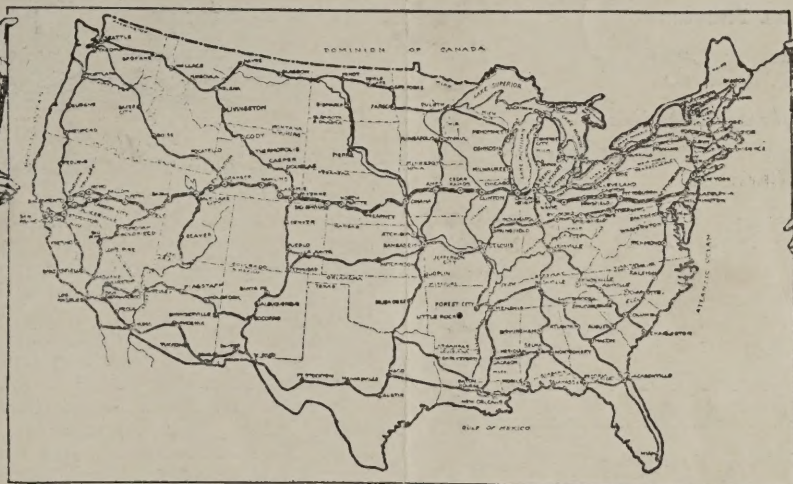
The Highwayman

The Shore Route, (No. 4) near Middletown

October 1922

The Highwayman Is Out
For More and Better Roads
in New Jersey

Vol. II No. 3



A sketch map which indicates how the Lincoln Way, "The Main Street of America," correlates a vast number of important highways and serves as the great central main line for through traffic—the backbone of a national highway system



The Greatest Road System In The World--And You

I do not know the name of the man who built the roads of Rome.

But what he did was greater than the work of Caesar's conquering armies. Perhaps there will yet be a monument built to him, after the last of the captains and the kings depart, and the tumult and the shouting dies away, and we finally get down to the world-wide worth-while job of letting everybody earn a decent living in peace.

In the meantime, let us congratulate ourselves that we live in a country that is at least saner than most of the rest of the world.

A country which has had common-sense enough to go ahead, in spite of the generally upset condition of the world, and build the greatest road system ever dreamed of in man's history—a net-work of highways, thousands upon thousands of miles, tying every State in

the Union to every other State, doing more than anything else has ever done to make a really united Nation economically and socially.

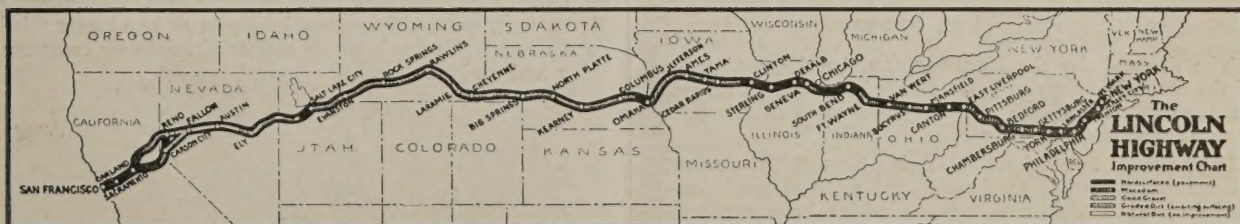
The day has come when that State which has not provided itself with an adequate road system, is linked up as backward and second-class.

There is no State in the Union where the need for first class road service is more vital than it is in New Jersey. Let us be satisfied with nothing less than a state road system that is second to none in the country.

The better the road system we build now, the greater will be the opportunities for our State tomorrow.

But it's up to you.

The Highwayman



The famous "Lincoln Highway", the longest highway "route" in the world, and some of the important cities through which it passes—(Maps by courtesy of "Motor.")

The Highwayman

The Highwayman

Published Monthly By The
State Highway Department, at Trenton, N. J.

The HIGHWAYMAN will be sent free upon application
to any citizen of New Jersey who is interested in
"More and Better Roads For New Jersey!"

THE HIGHWAYMAN

H. C. SHINN, *Editor in Chief*

Associate Editors

A. LEE GROVER R. B. GAGE
C. F. BEDWELL EDWARD E. REED
CHAS. FISHBERG

Managing Editor

F. F. ROCKWELL

State Highway Commission

Governor EDWARD I. EDWARDS, *Ex Officio*

Hon. GEO. L. BURTON, Chairman	- - - - -	South River
BENJ. E. FARRIER	- - - - -	Jersey City
GEORGE PADDOCK	- - - - -	Newark
WALTER F. WHITTEMORE	- - - - -	Newton
THOMAS E. COLLINS	- - - - -	Elizabeth
ALBERT S. L. DOUGHTY	- - - - -	Mt. Holly
CHAS. F. SEABROOK	- - - - -	Bridgeton
CHAS. V. DUFFY	- - - - -	Paterson

State Highway Association

President	- - - - -	A. W. MUIR
1st Vice President	- - - - -	W. A. JOHNSON, <i>Laboratory</i>
2nd Vice President	- - - - -	J. L. VOGEL, <i>Bridge Division</i>
3rd Vice Pres.	- - - - -	WILLARD EMMONS, <i>Equipment Div.</i>
4th Vice President	- - - - -	G. R. MOORE, <i>Right of Way</i>
5th Vice President	- - - - -	WM. J. MCGOVERN, <i>State Labor</i>
6th Vice President	- - - - -	H. D. ROBBINS, <i>Construction</i>
Executive Secretary	- - - - -	EDWARD W. O'BRIEN

An Article Worth Reading

In this issue of THE HIGHWAYMAN, you will find an article by Colonel Stevens, who was formerly Commissioner of Public Roads for the State of New Jersey.

This article is at the same time, one of the most interesting and one of the most unusual things you have ever read. The matters of which Colonel Stevens writes concern every citizen of this state, no matter what his business may be. Every word of this article, which is as interesting as fiction, you should read, then study the charts and tables which show in actual records what has happened since Colonel Stevens made his remarkable prophecy. We believe that no man with common sense can do this without seeing the absolute necessity of our having a systematic, adequate, planned-in-advance program for the development of the road system of our State.

If You Want to Continue to Receive the Highwayman Renew Your Subscription Now

The demand for the HIGHWAYMAN, by the road users of the State, has been so great that it has required several increases in circulation. We can continue to send it only to those who are really interested.

If you wish to continue to receive THE HIGHWAYMAN, fill out and return to us the enclosed self-addressed postcard before November 1. Names which have not been renewed in this manner by this date, will be dropped from our list.



Mr. Jacob Hagin

Superintendent of Plant and Equipment

Jacob Hagin, known to most of us as "Jake", was born in Albany, New York, on Christmas Day, 1884, almost 'neath the shadows of the capitol building of that great state. When he was five years old "Jake" decided to try his luck in "Jersey", and so in 1889 he moved his family to this State.

He obtained his preliminary education in the schools of Elizabeth, N. J., and later attended Columbia University, graduating from that college in 1903.

In 1908, Mr. Hagin became connected with the automobile industry and has remained in that business ever since. He first became affiliated with General Motors at Flint, Mich., representing several lines of cars under control of that corporation. He has at various times been connected with the factories of the Buick, Oldsmobile, Cadillac and Chevrolet Motor Companies.

On October 1, 1920, Mr. Hagin became connected with the State Highway Department, as Supt. of Plant and Equipment, which position he now holds.

We tried to find out from "Jake" just how important he was, because, as every one knows, the Equipment Division has a tremendous job on its hands. One might expect the head of the Division to feel somewhat proud of his accomplishments. "Jake" says: "There ain't no such thing as my accomplishments, it's OUR accomplishments. Full credit must be given to the team work of the men working with me."



Mr. H. C. Shinn,
Engineer of Special Assignments,
Trenton, N. J.

August 21st, 1922.

Dear Sir:—Colonel Stevens' article on "The Future of Good Roads in State and Nation" impressed me so greatly at the time of its first publication in *Scribner's Magazine* that I saved a copy of the magazine.

Many of the thoughts expressed are now a matter of common practice and thought with Highway officials throughout the country. My object in desiring this article re-printed is that the people may become impressed with the wisdom of taking seriously and profiting by the work of men of the type of Colonel Stevens, so that the progress of Highway construction may keep abreast of the growing needs of traffic.

If we would face conditions fairly and honestly, and analyze the conditions of today in the same manner Colonel Stevens did in 1914, and from this analysis make a forecast of conditions to be expected eight to ten years from now, we could reasonably expect to be abreast with our worst traffic needs in the matter of Highway construction and maintenance.

Very truly yours,

J. Brasser

State Highway Engineer.



Benj. E. Farrier

Another Member of your Highway Commission

Benjamin E. Farrier was born in Jersey City, N. J., on May 22, 1879. He got his early education in Public School No. 3 of that City, later attending Hasbrocks Institute and Drakes Business College. When eighteen he entered the plumbing and heating contracting business of his father, William W. Farrier. This firm was established in 1886 in Jersey City, and has done a great amount of the largest installations of work in that line in the industrial and public buildings of that city.

Mr. Farrier is active in Chamber of Commerce affairs in Jersey City. He served on the Board of Direction for eight years, and as Chairman of the Entertainment Committee for the same length of time. He has been active in the automobile club of Hudson County, and an enthusiastic motorist for many years. The Rotary Club of Jersey City; a popular member of the Carteret and Down-Town has served on the Board of Directors and was elected President of that Club in 1921.

Fraternal organizations in which he is interested are the Elks, and the Jersey City Lodge of F. & A. M. He is also a member of the Master Plumbers Assn., of Jersey City; a popular member of the Carterat and Down-Town Clubs, also of that city; and President of the Knockers Club of Jersey City.

He is an ardent exponent of Sir Isaac Walton, as he has represented the Belmar, N. J., Fishing Club as President for the past three years.

In financial circles he is a member of the Board of Directors of the New Jersey Title Guarantee & Trust Co.

"Big Ben", as he is called and known by his friends in Jersey City, is married, and has four children. He has travelled extensively in this country, Canada, British Columbia, Alaska and Mexico, and has always been a keen advocate for good roads and road improvement.

Mr. Farrier was appointed a member of the State Highway Commission July 27, 1922.

When You Think of St. Valentine Plan For That Big Convention

If you are one of those who missed out on last year's Highway Department convention, you want to get busy right now and make your plans to attend the convention which will be held this year.

The date has been set for February 14—St. Valentine's Day—to February 17, inclusive. Put this down in your little notebook as "Highway Convention Week."

A. Lee Grover, chairman of the committee on arrangements, and the Secretary, Mr. Charles Fishberg, are planning to make this year's convention an even greater success than last year's. We'll say that they have some job on their hands to succeed in doing that! If you want to know more about what is going to happen, ask either Lee or Charlie.

If you happen to be a manufacturer or dealer in highway equipment or material, just keep in mind that it's going to be "first come, first served." This year, one of the big features of the convention will be the exhibits of equipment and material. Spaces are being allotted in the order of application. A word to the wise is sufficient!

NEW JERSEY STATE HIGHWAY DEPARTMENT

August 1, 1922

Executive

HON. EDWARD I. EDWARDS, Governor

The State Highway Commission
and

THOMAS J. WASSER, State Highway Engineer
ADMINISTRATION

A. LEE GROVER, Secretary and Chief Clerk

M. L. HOWELL - - Chief Auditor and Accountant
CHAS. FISHBERG - - - - Assistant Chief Clerk
R. W. WILDBLOOD - - - - Purchase Clerk
MISS GRACE WILLIAMSON - - - - Chief File Clerk

CONSTRUCTION DIVISION

C. F. BEDWELL, Construction Engineer

G. R. MOORE, Ass't Construction Engineer

R. A. MEEKER - - - - Right of Way Engineer
JOHN L. VOGEL - - - - Bridge Engineer
THOMAS GEORGE - - - - Supervisor of State Labor
C. A. BURN - - - - Northern Division Engineer
H. D. ROBBINS - - - - Central Division Engineer
J. A. WILLIAMS - - - - Southern Division Engineer
L. F. HALL - - - - Chief Draftsman

PROJECTS DIVISION

EDWARD E. REED, Assistant State Highway Engineer

A. D. BULLOCK - - - - Projects Engineer
H. C. SHINN - - - - Engineer of Special Assignments

MAINTENANCE DIVISION

ALEX W. MUIR, Superintendent of Maintenance

F. D. WOODRUFF - - - - Assistant Supt. of Maintenance
E. M. STORER - - - - Chief Inspector

EQUIPMENT DIVISION

JACOB HAGIN, Superintendent of Plant and Equipment

N. C. APPLEGATE - - Asst. Supt. of Plant and Equipment
J. J. TYMAN - - - - Asst. Supt. of Plant and Equipment
F. M. DEVEREUX - - - - Asst. Supt. of Plant and Equipment

TESTING LABORATORY

R. B. GAGE, Chemical Engineer

J. G. BRAGG - - - - Senior Testing Engineer
F. H. BAUMANN - - - - Senior Testing Chemist

Again This Year—The Snow Must Go

Probably no work done by the Highway Department last year was of greater immediate service to the road-using public than the "Snow Removal" program that was carried through so successfully.

This was made evident by the large number of letters we received commending the work, and hoping that it would be continued.

It will be continued. The same volunteer organization of employees of the Department, with the co-operation of the Contractors, will handle the snow removal work this coming winter.

The Works Committee meeting of August 28 started a discussion of Snow Removal subjects and it was decided to start preparation of organization charts in the near future, in order that everything may be in readiness when the snow comes.

Men who have joined the Department on a monthly basis this year, it is expected, will join in the work with the same spirit and enthusiasm as others who have been tried by the fire, that is to say, snow.

August 21st, 1922.

Mr. Hickey,

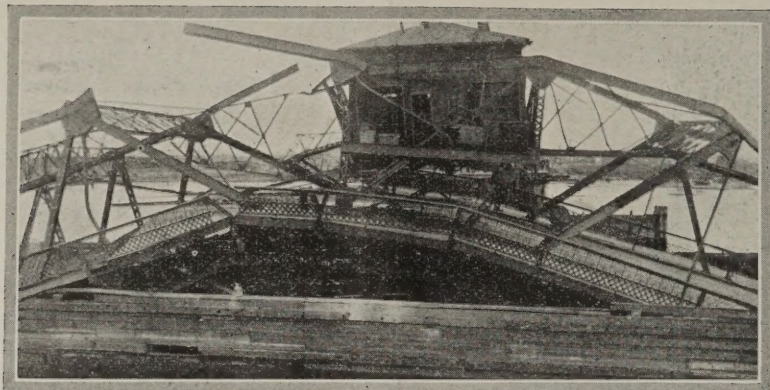
Master Mechanic of the Mouth-organ Gang.

Dear Sir:

Very truly yours,

"Buck" Reading.
"alias" WILLIAM B. READING.

The Highwayman



This is how the remains of the Hackensack River bridge looked after it was "rammed"

Hackensack River Bridge

By JOHN VOGEL, Bridge Engineer

On June 22, 1922, at 8.15 A. M., the steamer "Glendrael", shown on page 5, collided with the open draw-span of the Hackensack River Bridge located on State Highway Route No. 1 (the Lincoln Highway) between Jersey City and Kearney; shoving the bridge eight and one-half feet off center and resulting in its complete destruction, as is clearly shown above. This road is one of the most heavily travelled highways in the country and the traffic shut off, as a result of this accident, was forced to detour via the Newark Turnpike, located about one and one-half miles north of Route No. 1, and the only other means of travel between Jersey City and Newark. The congestion which resulted from the diversion of this large amount of heavy traffic can only be appreciated by those who were unfortunate enough to have to make this detour.

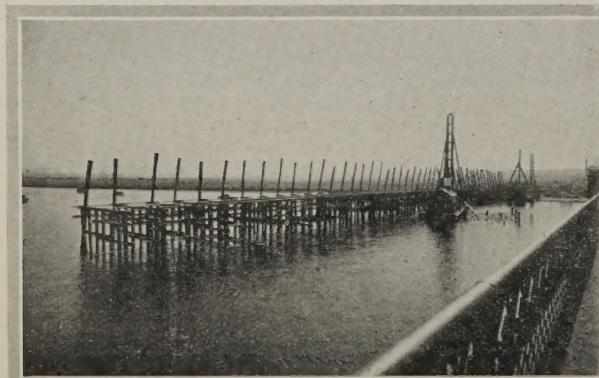
On July 1st, 1922, the State Highway Commission was to take over Route No. 1 (the Lincoln Highway) through Newark to Macy Avenue, Jersey City, including the Passaic River and Hackensack River Bridges. The State Highway Engineer, realizing the seriousness of this accident, immediately brought the matter to the attention of the Commission. On June 29th action was taken by the Commission for the construction of a temporary bridge at this point, in order that the congestion of traffic on the Newark Turnpike might be relieved. The same day the survey and plans for this work were actually started. The contract was awarded to the Stillman, Delehanty and Ferris Company, and on July 3rd, 1922, their equipment arrived on the job. Due to the fact that July 4th was a holiday, work did not actually start until the following day. Meanwhile, application was made to the Board of Commerce and Navigation, of the War Department, for a permit to construct this temporary bridge. After a great deal of consideration and study, it was decided to construct this temporary bridge about 150 feet north of the present bridge. This would allow the reconstruction of a perma-

nent bridge without offering interference either to the construction work or to traffic using the temporary structure. The temporary bridge now under construction will consist of pile trestle approaches, with a swing steel draw-span over the channel, which will provide for a 75 ft. clear opening on one side and a 68.6 ft. clear opening on the other, as required by the War Department. This bridge will have a 24 ft. clear roadway, with a 7 ft. sidewalk on one side. Provisions are made for two lines of trolley traffic and heavy motor trucks.

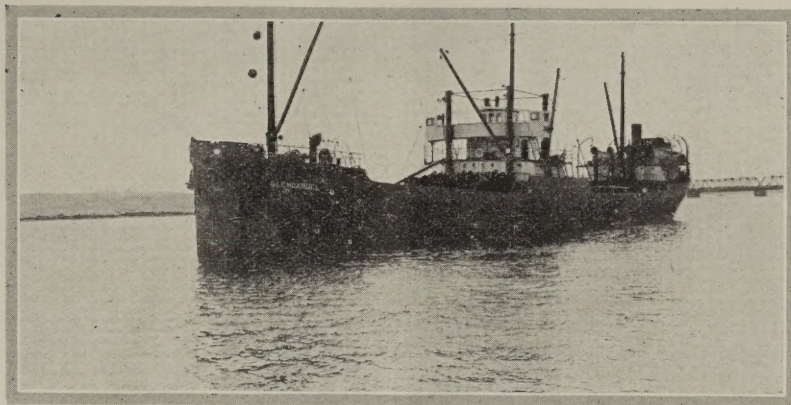
The progress made in the construction of this temporary structure may be seen by referring to Fig. 3, which shows the east approach and Fig. 4, showing the west approach. Practically all of the work shown in these pictures was done in 13 days. Attention is also called to Fig. 5, which shows the west approach, where it joins the present highway, and Fig. 6, showing the east approach, indicating clearly the easy grade and alignment over this structure.

Before any work could be done toward the removal of the damaged portion, it was necessary that proper legal action be taken. When Route No. 1 (the Lincoln Highway) was taken over on July 1st, the State did not take over the old Bridge due to the litigation which had been started by the two counties against the Steamship Company. It was not until about August 11th, after the Engineers representing the interested parties had completed their survey of the damaged bridge, that orders were given the contractor to start removing the damaged draw-span.

On September 3, 1922, the northerly half of the damaged draw span was practically removed, which also included the center bay of the draw, including the engine house and supports. In order to remove the lower part of the north half of the draw, a 100 ton derrick of the Merritt Chapman Company was used, as the old steel was tightly wedged in the old fender system. It was necessary that the north half of the damaged span be removed in order that the center pier and fender racks for the temporary draw could be constructed.



Reconstruction of the Hackensack bridge (left) Fig. 3 showing progress being made on the east approach of the temporary bridge; (right) Fig. 4, and also the progress being made on the west approach.



The steamer "Elendaruel", which collided with the bridge

A Letter That Speaks for Itself

Phila., Pa., Aug. 15, 1922.

Mr. R. B. Gage,
Chemical Engineer,
Quarry & Taylor Place,
Trenton, N. J.

Dear Sir:—I hereby report a collision between motorcycle No. 0-10 New Jersey License C—, 1922, operated by me, and a fence post on the property line of the Texas Company, Marcus Hook, Pa., with the resulting damage to the motorcycle of one badly bent front fork and mud-guard, and possible internal injuries. I was fortunately entirely unhurt. The fence post is a total loss, being sheared off even with the ground.

The accident was caused by a bump in the road, which threw my side-car in the air, due to the road curving at that point. Before I could recover my equilibrium, I had hit the post.

After three hours' work with the assistance of one man and an oxy-acetyline blow-torch and one dollar and a half (for the assistance of the man) I was enabled to return to the city.

We could not entirely straighten the fork, and as a result the machine has a tendency to steer to the left, and it is impossible to assemble all parts as they should be.

The machine should not be used until repaired. It can be run, however, and I await instructions when to bring it to Trenton.

In addition to the above, the front license was torn off, the left grip (handle) was likewise removed, and the front tire punctured.

A new front fork and a thorough inspection are practically all it needs.

I would appreciate very much having another effort made to secure for me a Ford or Dodge.

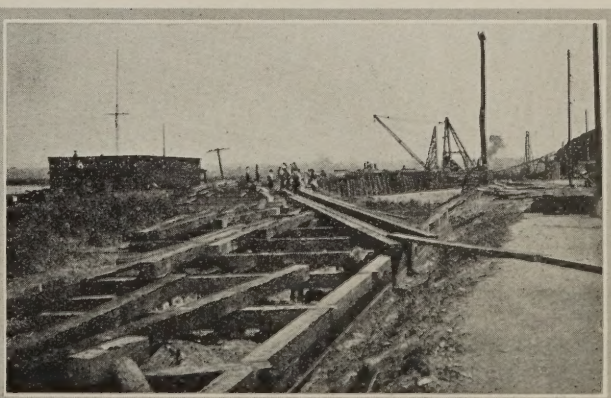
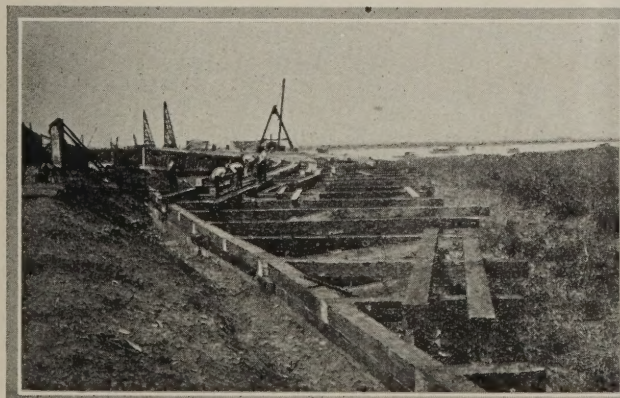
Yours very truly,

Inspector.

"A Message from the Chief"

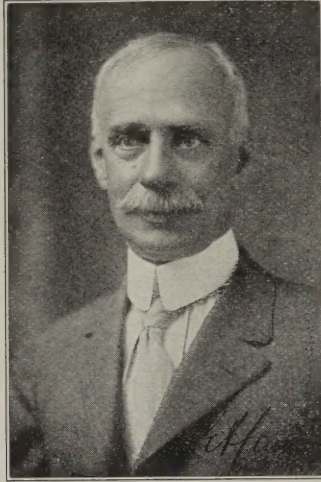
The Highwayman has served its mission. In order to continue, it will be necessary to charge for subscriptions at the rate of \$100 per year in advance. If sufficient subscriptions are received dating from January 1 next for the year 1923, the magazine will be continued. If not, its publication will be suspended. Should the publication be suspended, all unexpired contracts for advertising will be adjusted, and all subscriptions which have been received will be refunded.

(Note: this notice will replace the announcement made on page 2, of this issue, under the heading. "If You Want to Continue to Receive the Highwayman Renew Your Subscription Now.")

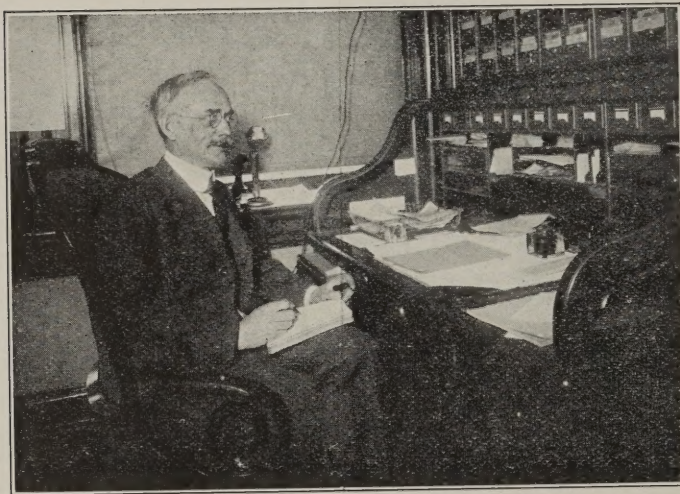


Progress has also been made on the new permanent bridge, as shown in the photographs above; (left) Fig. 5, showing the easy grade and the alignment over the new structure and (right) Fig. 6, the west approach where it joins the present highway

The Highwayman



The Late Col. Edwin A. Stevens
Former Commissioner of Public Roads of New Jersey



The Colonel at work. Colonel Stevens was not only tremendously interested in highway matters in his own State, but he was a deep student of highway transportation problems and their relation to industrial and social economics. No one can read this article of Colonel Stevens without stopping to think what our highway needs will be five or ten years from now, and to see the vital necessity of preparing in advance to meet them.

A Prophecy That Has More Than Come True

In 1914 Edwin A. Stevens, Commissioner of Public Roads of New Jersey, wrote an article which was published in the February, 1916, issue of Scribner's Magazine, on "The Future of Good Roads in State and Nation."

Colonel Stevens, during his term of office as Commissioner of Public Roads, became well known throughout the State, and by a number of serious minded persons was considered to be quite visionary. There is no doubt but that the article above referred to, written by him, was considered at that time, proof that he was a rank visionist. However, time has proven quite the contrary, and upon analyzing the conditions of today and comparing them with such a prophecy as Colonel Stephens wrote, one becomes more impressed with the fact that "A pound of foresight is worth a ton of hindsight." We will quote herewith from the article above referred to:

"In no country has the growth of the highway problem in importance and in difficulties been greater than in the United States, and in none does it seem likely to be greater

in the future. Our motor-vehicle registry is already the largest in the world.

There appears to be no near limit to the ingenuity of automobile-designers, to the enterprise of manufacturers, nor to the capital that is being poured into the business.

The effect of these industrial phenomena on our roads is worthy of most careful thought. The problem in its most simple and general statement is one of transportation. The cost of transporting one ton a mile at any given speed will divide itself naturally into two parts: first, the cost of providing and running the vehicle, including upkeep, fuel and lubricants; second, the cost of providing and maintaining the roadway in such shape that the sum of both parts of the cost of transportation shall be a minimum. The latter is the special province of highway administration. To discharge this duty, provision must be made for the future traffic.

To do this intelligently we must form some idea of the traffic of today and of its past growth. The horse-drawn

of New Jersey

traffic is practically unknown; it will probably not show any material increase, though, in the minds of many authorities, it is not likely to decrease. It is also less trying on our road surfaces.

Forecast of Automobile Registration Based on Statistics of 10 States

The following statistics as to automobile registration in ten states that have undertaken the systematic improvement of their roads affords us a means of foretelling what is to be expected within the next few years for the nation:

MOTOR VEHICLE REGISTRATION AND POPULATION

State	1910	1911	1912	1913	1914	Estimated 1915	Population 1915	Inhabitants per Motor Vehicle
Massachusetts	31,360	38,907	50,132	62,660	77,246	99,000	3,700,000	37.4
Rhode Island	5,911	7,262	9,357	11,312	13,530	15,600	618,000	39.6
Connecticut	11,789	16,372	21,371	26,560	32,790	39,000	1,235,000	31.6
New York	*62,655	83,969	105,749	132,928	168,428	222,000	10,300,000	46.4
New Jersey	49,478	55,913	54,317	61,075	70,910	91,500	2,960,000	32.4
Pennsylvania	37,180	48,108	65,519	89,584	125,189	180,000	8,500,000	47.2
Maryland	†5,000	7,273	9,749	12,997	20,238	33,000	1,350,000	40.9
Virginia	†2,800	4,020	5,760	9,022	13,984	22,000	2,180,000	99
Ohio	32,000	45,788	63,124	86,156	122,504	184,000	5,100,000	27.7
Illinois	†30,000	42,615	77,250	106,839	145,992	190,000	6,100,000	32.1
Totals	268,173	350,227	462,328	599,133	790,811	1,076,100	42,043,000	‡39

* Part of year. † Estimated ‡ Average.

At the date of writing, the figures for 1915 can be closely estimated. The conditions in the States chosen may not today be representative of the whole country. In those States, however, where little or no road work has been done, registration will take sudden increases, when good roads become available, as shown for Virginia and Illinois.

The ten States named register today over 1,000,000 of the 2,000,000 cars usually accepted as the number owned at this time in the country at large. I estimate for them a possible total automobile registration of 3,300,000 in 1920, and for the country from 6,000,000 to 6,500,000. To check this estimate we may use the figures of automobile output. These, as generally given, will not plot in any fair curve, but the conclusion seems warranted that an output of 2,350,000 may well be obtained by 1920. Men well posted in the business estimate that within a short period a market can be made for from 1,640,000 to 3,800,000 cars a year. For our present purpose we must make some allowance for a rapidly growing export trade.

If the average life of a car be three years, it seems possible that by 1920 we shall have on our highways a total of not less than 6,000,000 motor-vehicles, or one for every twenty inhabitants. This is about three times our present registration. In the ten States the increase in five years has been fourfold. Massachusetts registered one motor-vehicle for every 108 persons in 1910, and one for every 37.4 in 1915. In 1910 the population per car in Ohio was 149; today it is 27.7.

(From the chart shown herein taken from the United States Bureau of Public Roads, it will be seen that the total automobile registration in the U. S. for 1920 was 9,232,000, even exceeding the estimate of Col. Stevens by 50%, and for 1922 it was 10,440,000.)

Future Mileage of Improved Roads

To care for this traffic we have in the United States about 2,125,000 miles of country roads, not counting streets. What mileage has been improved it is impossible to say, for the word has no standard meaning. We are probably safe in assuming that for a satisfactory system not less than 1,250,000 miles of road must still be improved. With the ever-growing traffic and with the consequent demand for better construction, the ultimate cost of this system will not fall short of \$10,000,000,000, and its construction will probably cover a period of not less than forty years. These figures do not over-state the case.

(It will be seen that Col. Stevens has estimated on an

average cost of \$8,000.00 per mile in estimating the total cost of an adequate road system for the country. In saying that "these figures do not over-state the case" he was certainly far on the safe side, because a macadam road of sufficient width for two lines of traffic will cost on an average of \$25,000.00 per mile today. The more durable, hard-surface pavements will cost on an average of \$50,000.00 per mile today, except in unusual cases where local materials are used on a very light traffic road near the source of supply. It would hardly be possible to build any sort of a road today to accommodate two lines

of traffic for \$8,000.00 per mile.)

Many roads have been built and will be built too narrow, too crooked, with excessive grades and inadequate pavements. These should be widened, straightened, regraded, and repaved. They will also have to be provided with bridges designed for the increasing weight of vehicles. However this may be, it seems safe to say that we have a big job on our hands, and that if we are to plan for its execution we must do so in a big way.

Comparison with European Conditions

One would naturally look for experience to Europe. European conditions and customs are so different from ours that data derived from them are of but limited value. We must remember, too, that they are in a much more backward state of motor vehicle development, even if more advanced in road administration.

However, much or little we may take from them, we shall also have to consider our problem in the light of what seems to be in store for us.

Saving in Operation of Vehicles Will Build Roads in Three Years

Let us consider the full extent of the problem—what we are now doing to solve it, and what is needed to obtain good roads.

Assuming for a moment that in 1920 we shall have six million motor vehicles and six million teams using our roads, that the motors will average 200 days at 30 miles and the teams 180 days and 15 miles, we have totals of 36,000,000,000 motor vehicle miles and 16,200,000,000 team miles. The difference in cost of operation on an improved as against an unimproved road may be safely put at not less than 6c per mile for both motor and teams. On this basis we would have 52,200,000,000 vehicle miles at 6c, or \$3,120,000,000—the total yearly saving.

(Considering this estimate on the total yearly saving in cost of operation of vehicles on an improved as against an unimproved road as being equally as conservative as the estimate of the total cost of building an adequate road system throughout the country it will be seen that the yearly saving would in a little over three years pay the entire cost of building a system of good roads.)

I need only allude to the other gains due to good roads—the opening up of the country, the development of industries, the improvement of the conditions of agricultural life. These cannot be readily estimated in figures, but



Route 4, between Keyport and Red Bank, between six and seven P. M.,
Sunday afternoon, August 20

the value is certainly not less than the reduction in cost of haulage and probably exceeds it many fold.

Road Administration and Organization

The importance of the interest involved would seem to warrant the expense of scientific and business-like administration. Such administration we lack; we seem to have formed but a faint idea of our woeful state of unpreparedness and of the seriousness of the results. Our present methods of road administration are inadequate.

While most of the States have preserved the common law doctrine of the King's Highway, the treatment accorded to our roads has not matched the dignity of their titles. Generally, the roads, except in the case of city streets, are in the hands of some local body or of a turnpike company. The care they have received is such as might have been expected in a community descended from pioneer ancestry. The traditions still survive of the days when each man raised his own food, built his own house, and looked to no policeman to enforce his rights. Any man, in those days, was supposed to be able to build and keep a road, and this belief is by no means dead. It shows itself in the underlying idea of our road administration, the turning over to township committees, selectmen, or by whatever name they may be known, the management of the greater part of our road system. In most of our States we have placed bridges under the care of somebody other than that in charge of the roads.

On this sub-structure many of the States have built, each in its own way, to provide for our increasing highway traffic. The laws passed for this object may be grouped into two general classes, following the lead set by the two States that first took up road improvement as a field for State activities, namely, New Jersey and Massachusetts. The former undertook to aid counties in the building of improved roads, leaving the care of the roads thus built to the county authorities; Massachusetts, on the other hand, set herself to building and maintaining a system of State roads made up of the most important through lines of traffic. Both of these represent correct principles. The State should care for the important through lines. Local bodies should be encouraged to improve roads of secondary importance. Neither of these States, however, undertook to thoroughly provide for the proper care of all of its country roads, nor, as far as I know, has any other State. Nothing less than this will meet the need. Every public road should be insured such intelligent care as to furnish the best service of which it is capable.

My own experience as a road official may be enlightening. A Mechanical Engineer by training, with scanty knowledge of road work, and even less experience in public office, I was appointed, five years ago, head of the New Jersey road department. The appointment, I believe, was considered a good one.

I expected to find very simple engineering, and ill-organized repair system and more or less "graft". I found the engineering by no means simple, that proper reorganization of the repair system would require voluntary co-operation and acceptance of State Control by the Counties, many of which were jealous of each other, and of the influence of the department. I found no real evidence of "graft", and no reason for suspicion against the

force under my control. This force had been formed and had worked under department heads, not one of whom had any previous engineering experience; it was personally well fitted for its work, but hardly large enough for statutory duties and utterly insufficient for the work necessary to insure thoroughness. There was much duplication of work between the State and County forces, and ill-located responsibility. While I cannot complain of any lack of good will, the work has been and is being done under conditions that exclude any high standard of attainment, and with a knowledge that no one expects results to measure up to any such standard.

Red-Tape and The Difficulty of Making a Legislature Understand Conditions

I may be slow witted, I have had to waste much time in planning how to get the work done under a legislation both unreasonably restricted and often inconsistent, and in learning to tie the red tape thereby required into the regulation bow-knots.

Whatever the cause, it has taken me time to "size up" my ever-growing job, to recognize the underlying causes of our short-comings, and to formulate the principles that must guide any satisfactory reform. I have, in consequence, met with but little success in impressing the needs of the service on the people of the State and on the Legislature.

During my term of office almost every one of our neighboring States has changed the head of its road department. This brings us to a most serious defect of our road administration, namely, that the head, whether a commissioner, or a Board, is a political appointee, usually un-skilled in road work and frequently without any engineering training. Holding office for a term of years, subject to great political pressure, and intrusted with wide power, it would, indeed, be wonderful if these men did not frequently yield to considerations other than the best interest of our roads and err by dabbling in engineering matters.

Instead of appreciation of the seriousness and the needs of the situation, one generally finds in our legislatures a faith in the efficiency of certain pet remedies and a leaning to numerous checks, safeguards, and investigation, the outgrowth of lack of confidence in the road administration, fruitful sources of delay, red tape, and waste, and god-sends for the muckraker.

I have never seen a palladium, or if I have, I did not recognize it. It seems, however, that the particular palladium that holds or guards our liberty is likewise the shrine in which we cherish these methods of insuring inefficiency.

Over our road work there is too often cast the baleful shadow of politics. The "scientific distribution of patronage," as it was once described to me by a very earnest, upright, and capable politician, who believes himself a progressive, plays havoc with efficiency. The only refuge seems to be in the civil service, as generally administered, a somewhat cumbersome and usually inelastic method, but still the best now available. Patronage, however, is not the only line along which politics makes its attacks. Roads have been improved or repaired because certain men "with pulls" lived along the line, because certain contractors had plants in the neighborhood for which they wanted

The Highwayman



The road is so solid with cars that it keeps a number of

employment, or because some other work of importance could not otherwise get the necessary backing. I am not now alluding to any so-called "graft". This is always hard, generally impossible, to prove. The direct loss therefrom is, I am persuaded, small compared to that due to inefficient administration; indirectly, however, it works immeasurable evil by depriving our road officials of the public confidence they must have if we are to get results. These must be based on personal responsibility enforced by a strict discipline. Responsibility implies power, and power will not be conferred if there be a lack of confidence. This confidence must not be in the individual head only, for he may and will change, but in the organization, and not only in its moral but also in its technical fitness for the work. It must be earned by actual results and cannot be created by legislative enactment. Such enactment, however, is the only means that can create organizations under conditions which will make these results possible. We must look to an awakened public opinion to demand the necessary legislation and a fair chance to "make good" thereunder without unnecessary interference.

Comparison of France with Ten Eastern States

I have said that European experience is of but limited value to us in the solution of our problem. The weight given in Europe to the administration of their roads is, however, instructive. The French republic has been the classic example of road administration. It compares with our ten states* as follows, the French motor vehicle figures being for the period before the great war:

	Road Mileage	Area	Population	Motor Vehicles
France	357,000	207,000	40,000,000	122,000
Ten States	457,000	261,000	42,000,000	1,076,000

French Engineers Work Under Different Conditions Than We Do

In France all national roads and most of the departmental roads are under the care of the celebrated "Ponts et Chaussees" corps. This corps is the best and most thoroughly trained body of civil engineers in the world. Their men are especially trained for the work from boyhood, as are cadets and mid-shipment. Their life work is in the corps. Their instruction covers the engineering, the administrative detail, and the law referring to the subject. The standing of the corps, personally and professionally, is of the highest.

Contrast for a moment our conditions. There is no legal standard of qualifications for an engineer, least of all a highway engineer. The job is seldom permanent. There is but little confidence in the ability, and but too often in the integrity of highway officials. This is hardly to be wondered at when we recall that we are trying to care for a fast-growing motor traffic, today sixteen times that of the French Republic, under the leadership of political appointees holding office for limited terms, and working under laws that make efficiency impossible.

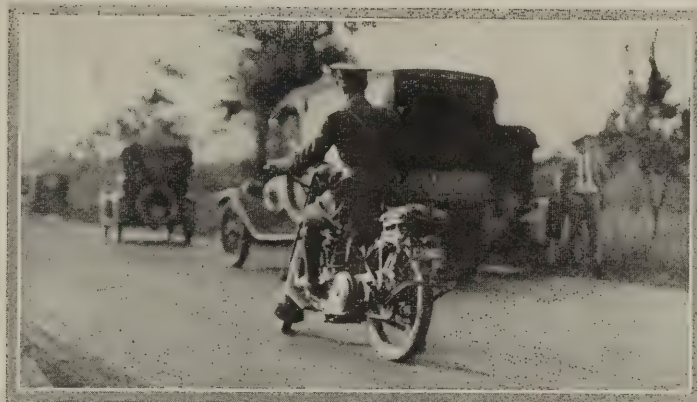
To avoid any misunderstanding as to our highway engineers, let me, in this connection, bear witness to the devotion and ability of those with whom I have been thrown in contact. There are, of course, lamentable exceptions, but as a whole they are morally and technically of higher class than one would expect under the conditions. There

is, however, little organization, no recognized standard of qualifications, and practically no interstate co-operation. Road societies there are, but these are organized to "boost" the cause of roads and only incidentally to afford technical training and interchange of data.

Practical Solution of the Problem

The very evident cure for our present evils and the best provision for the future is such legislation as will establish in each State a highway force that will command respect and confidence in its ability. We must then state our problem, and this, too, will generally require legislation. Even in the smallest and in the sparsely settled States the cost and importance of the work will warrant thorough preparatory study. But little of this has been done. We have tackled the job of improving our roads with an insouciance that would be almost laughable if its results were less ominous. Few, if any, States have any accurate idea of their country-road mileage, much less of its proper and economical development, and, I may add, practically none at all of the ultimate cost nor of the duration of the period of improvement. Yet all these can at least be approximately ascertained, and the public which pays the bill is entitled to the information. We are, however, embarked on a programme involving an unknown expenditure for an unknown period, and we do not know what we shall have at the end. If we are to accomplish anything we must "size up" our job and, remembering Davy Crockett's advice before it is too late, be sure we are right before we go much further.

For this purpose we should lay out a road system for each State. Such a system will include roads of all classes. If national roads become a fact they will form a separate class. There will also be the main lines of intra-State traffic, then roads of secondary importance furnishing the principal feeder lines for the State highways and connecting towns of secondary importance, and, lastly, the lesser roads corresponding to the capillaries in the system of blood circulation. Each of these classes will call for different features of design and for different types of paving. For our greatest roads it would seem that the best will be none too good, for the smallest our means will demand that we adopt the most economical construction. Without thorough preliminary study and planning we shall, beyond doubt, build roads, some insufficient for their loads and others more costly than their traffic will warrant. I may here point out that the permanent investment in a road is made up of the cost of the right of way and of grading. Drainage works and foundation courses may be or may not be permanent; the same is true of bridges; but surfaces are never permanent. If, however, we secure enough land and grade it properly at the outset, our investment to that extent is secure. Land can always be had more cheaply before improvement than for subsequent widening and straightening. Regrading disturbs conditions along the road, inflicting at times considerable loss, and disturbs more or less previous work. Hence, it is wasteful and should be avoided by giving location and grading full consideration in the original design. This consideration cannot be given without knowledge as to the importance of the road. Our railroads have found that on main trunk lines it pays to



*State partolmen busy to maintain a clear right of way for south bound traffic.
You can see why wider roads and wider rights-of-way are necessary*

reduce grades and eliminate curves at almost any cost. "Mutatis Mutandis", the same is true of the highway.

Our legislation should extend to all country roads. Streets present another problem. Just as physically and commercially all roads in a State form part of one system, so the State must provide that they be administered under uniform laws and in co-ordination. The public has a right to expect and the State should provide that every road be so kept as to give the best service of which it is capable.

There must be a strict, uniform and scientific system of accounting and audit, including an accurate census of road traffic. The resulting data must be carefully analyzed to enable those in charge not only to make comparisons, but also clearly to account for the discharge of the trust imposed on them.

We must, in all cases, have such elasticity in statutory provisions as will cut the red tape down to a minimum.

The importance of the work to be done will justify provisions that will make highway engineering a career that will attract and hold young men of ability and energy. Material of this character can be trained to high efficiency if politics be excluded, if promotion follow on proven fitness and discipline be rigidly enforced. All higher positions must be filled by promotion so as to exclude dilettanti administration and freak engineering, and provide an incentive to continued effort. A force organized on these lines and public confidence therein are the important matters. Given these, the rest will follow. But such a force in any adequate number does not exist today, and it can only be created by establishing the proper conditions for its development and allowing sufficient time therefor. Even in such a small State as New Jersey, there would be needed for the state-wide oversight of roads more men than are fitted and available for the work. Even if men were available in sufficient numbers, they must be moulded into an organization, a living and growing organism with an "esprit de corps" and traditions.

(Another striking example of the foresight of Col. Stevens is in his statement above to the effect that "such a force in any adequate number does not exist today and it could only be created by establishing the proper conditions for its development, and allowing sufficient time therefore." This statement made at a time when one person in a hundred would not dream that sufficient trained engineers could not be employed to adequately handle the growing needs of our highways. Since that time, however, it has been necessary to do just what was prophesied, that is, to provide the proper conditions to train men in this highly important branch of civil engineering, so that the work would be adequately carried on.)

This will require time. In almost every State that has taken up road-work seriously there is a nucleus around which the force necessary for State-wide administration can be gathered and trained.

Road Work Calls For High Standard Engineer

Road-work calls for analytical study requiring the combination of experience, common sense, and technical training. It involves, also, in the higher grades, difficult administrative work, which cannot be readily separated from the engineering and executive ability of no mean

order. This always demands and must receive good pay. A high professional standard for such a force gives the members a pride in their organization and a confidence in its ability to do its work, without which it is useless to expect any full measure of success or of public trust. This latter, I repeat again, is essential to any satisfactory solution of our problem. Without it the public will not insist upon the exclusion of politics from road work, and before they will so insist the people must know that their business is being handled by experts and honest men.

The technical work to be performed by such a body should consist, in addition to the preliminary study needed, for the laying out of road systems, of design, construction, and maintenance.

Safety Considerations in the Design of Roads

"Safety First", of which we have heard much of late, needed but little consideration in the road design of the ante-automobile age. Any road was safe enough if it was good enough. Guard rails on high embankments, avoidance of sharp turns at the foot of steep grades, and a little care at approaches to bridges were enough to make a road reasonably safe at the speed and weight for which they were designed, say ten miles an hour and about three tons. It is no wonder that they have become "death traps" when called on to carry traffic at forty miles with maximum load of from 12 to 15 tons. The solution of the guard rail question is yet open. Any obstruction to the view within a distance of from 350 to 400 feet is highly dangerous. Curves on or at the lower end of steep grades, narrowness, excessive crown, unprotected ditches, badly placed trees or poles, and even the pipes often used to carry water across entrances, have become dangers that are taking a heavy toll of human life.

The most apparent dangers on our highways are the crossings over railroad and trolley tracks at grade. The elimination of these death-traps should never be overlooked. The cost of this work will form no small part of our future highway disbursements. Even when elimination is impossible, much may be done to decrease danger at crossings.

Design of Roads to Meet Conditions

As to pavements, for minor roads this will always depend on the relative costs of locally available materials. Gravel, oyster-shells, and macadam will probably always be able to provide for a considerable mileage of the lesser roads. Macadam with a blanket coat of tar or asphalt, well maintained, will carry a considerable traffic, but only at a fairly high maintenance cost. For more important roads Portland Cement concrete and bituminous concretes seem the most promising solution. Block pavements, brick, wood, asphalt block, and granite on a concrete base, will be required for the heaviest traffic, and for such grades on bituminous concrete roads as may be found too steep for that material.

Roads must be designed for the speed and weights that will be used on them. Whether there be a statutory speed limit or not, it is not seriously regarded, and will in time probably disappear. Any prudent designer today will count on not less than 40 miles. There is little use in providing a surface suited for such a speed without giving

The Highwayman



This will give you some idea of the heavy traffic coming from the shore points north

the corresponding widths and curvatures. Without knowledge of weights to be carried, bridge design is but guess work. Pavements and foundation course must also be suited to the weights to be carried. These should be regulated by legislation, uniform in all the States. The paved way for important roads should not be less than 18 feet on tangents; curves should have radii of not less than 1,000 feet with increased widths of paved surface.

Grades are a matter of both economy and safety; with bituminous surfaces anything in excess of 5 per cent. becomes too slippery for horses; automobiles will also skid dangerously thereon.

Road Signs and the Dust Nuisance

Many of the minor appurtenances of our roads deserve and should receive more thorough study than has generally been given them. Road signs, for example, should be legible from whatever side approached. Running beyond a sign before being able to read it destroys, to a great extent, its usefulness, and is a source of actual danger. Dust in excessive quantities is not only a nuisance, but has become a serious danger.

Shade Trees and Telegraph Poles

The correct placing of shade trees and the selection of the species used are matter of importance. Trees must not be placed so near the driveway as to be dangerous. The same is true of telegraph poles, sign posts, etc.

Consideration of Military Features in Design of Roads

The military features of our roads have been all but entirely overlooked. A few years ago a request for the views and advice of the War Department met with a polite but entirely unenlightening answer. Strategically, roads must connect points of military importance. Tactically they must be designed to carry necessary military traffic. In the light of the experience of the great war, this means that very heavy loads, guns of 6 and 8 inch calibre, heavy motor-trucks, high-speed cars, cavalry and infantry must be accommodated. Less than three lines of traffic will hardly meet with the requirements. Nothing less than thirty feet of graded width will do. Bridges must also be strengthened. It may well be that screening will be required.

Keep Cost Accounts

The designer must also carefully weigh the advantages of any proposed feature of design against its cost. He must bear in mind that the total road cost is divided into three parts: interest on the first cost; depreciation and up-keep, including the overhead charges due to administration, use of machinery, and, what is usually called the repair charge, the cost of the actual labor and materials used in repair. What he now has in most cases is the repair charge only, and that without traffic data. This charge may be easily kept low by an expensive construction. It may well be that a low-priced road with comparatively high repair charge will be the cheapest solution. Yet, on the other hand, too cheap a construction is sure to prove wasteful. It can easily be imagined that the designer has ample field in which to show his ability.

We have generally built good roads as far as construction work is concerned. We have probably been a little

too impatient for results and too easy-going to obtain all the accuracy in following a specification that we find abroad. Our inspection, too, in many cases, may have lacked in intelligence and thoroughness, but on the whole we have not done badly in this respect.

The up-keep of our roads has, on the whole, been disappointing. There are, of course, brilliant exceptions. If we are to have good roads we must provide a system that will make good minute defects as soon as they appear. This cannot be done without constant and competent inspection. The best way to provide this service will vary with roads of different materials and subject to different traffic intensities. Whatever method, however, is adopted, the importance of accurate accounting for all maintenance expenditures will remain undiminished. Such accounting in connection with traffic census furnishes the only test of the economy of road types and will supply indispensable data for scientific design. In the analysis of road accounts we must take account of speed as well as weight. As yet the unit giving the proper weight to each of these elements of wear has not been agreed upon. The value of such a unit and of road accounts generally depends, in great measure, on uniformity of method.

The State and Federal Co-operation and Co-ordination

Our task is such a huge one that for success we must have team work. Our federal scheme of government is a hindrance in securing the inter-state co-operation that the situation demands. It is not only in the planning of inter-state lines of traffic and in securing uniform laws as to classification of vehicles and regulation of traffic that this need exists. We should have standardization of nomenclature so that, for instance, "improved road" will mean the same thing in Indiana and in New Jersey; standard system of road-signs, standard methods of accounting, standard units of traffic and wear, and, in general, co-operation and co-ordination between our forty-eight State-road forces and the federal government.

That this co-ordination and the leadership needed for any team-work can be supplied only by the general government is, to my mind, the unanswerable argument for federal aid. The gain, by united and concerted effort will be greater than that due to any federal appropriation.

The Financial End of Highway Work

The financial problem involved is by no means the least of the many road questions that we must settle. I have already estimated the job as involving 1,250,000 miles of road to be improved at a cost of about \$10,000,000,000, and that it will take forty years to do this work. This is not all we will have to finance. While building and after having finished the work, we shall have to keep up the roads already built. This will involve a tremendous outlay. The present total road repair charge in this country is unknown, but we do know that much of it is wasted on unintelligent work.

Our data are so insufficient that no satisfactory financial plan can be worked out in detail. Let us, however, try an illustration, using for this purpose the above assumptions as to cost and mileage of construction and distributing the work evenly over the estimated period of construction. Let us also assume that we are today spending on the

FUNDS EXPENDED FOR CONSTRUCTION OF ROAD BED AND INVESTMENT IN MOTORIZED HIGHWAY ROLLING STOCK

TRUCKS VALUED AT \$1500 EACH
AUTOMOBILES VALUED AT \$750 EACH

1910 I

ROAD CONSTRUCTION \$95,000,000

1910 ■

MOTOR VEHICLE INVESTMENT \$386,250,000

1910-16 ■

INCLUSIVE

ROAD CONSTRUCTION \$1,056,000,000

1916 ■

MOTOR VEHICLE INVESTMENT \$282,250,000

1910-21 ■

INCLUSIVE

ROAD CONSTRUCTION \$2,526,000,000

1921 ■

MOTOR VEHICLE INVESTMENT \$832,200,000

PREPARED BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS

The rapid increase in motor vehicle investment indicates the need for a continuous highway development in order that the public may operate the motor equipment of the country with maximum economy. The U. S. Bureau of Public Roads in conjunction with the various state highway authorities broke all road building records in 1921, constructing over 12,000 miles of federal aid highways.

road repairs \$150,000,000, and that each new mile of road built will add \$400 a year to our expenditure. Our construction will average 31,667 miles a year and will cost about \$250,000,000. Our repair charge on present roads is, say \$150,000,000. Our yearly increase in repair charge will be $31,667 \times \$400.00$, or about \$12,500,000. Our first year's outlay would be \$400,000,000.

If we build our average mileage each year, we would have spent in the forty years, about \$26,000,000,000.

We must evidently look to our sources of revenue. Benefits are conferred by road improvement on both the land owner and the user of the road. The former pays through the ordinary tax levy. The latter pays a so-called license fee for his automobile only, and nothing for his horses. It seems rational to look to the business on the roads for part of the cost of building and maintaining them. Let us look for a moment at these costs.

At the prices now prevalent in the North Atlantic States, a mile of macadam road, including a bituminous dressing, can be built for about \$12,000, where the grading and drainage are not excessive; the latter may increase the cost to \$18,000 or more. Such a road can be maintained under an average daily load of 400 vehicles of mixed highway traffic, averaging about 1.7 tons in weight, at a yearly repair charge of about \$600.00 per mile. To this yearly charge should be added about \$200.00 as a depreciation charge to take care of extraordinary repairs, which would be needed about once in every five years. Add also 4% interest on cost, or say, \$500.00, and we have a total yearly cost of \$1,300 a mile. The yearly ton mileage would be 248,000. The cost divided by the ton mileage gives .524 of a cent per ton mile, or 0.89 cents per mile of the average vehicle. An automobile, therefore, making an average yearly mileage of 6,000 to an average weight of 3,400 pounds would receive a road service costing about \$53.40, and would do approximately \$33 worth of damage to roads of this character. For a team, which, with its wagon, averages loaded and light about the same weight and does 1,500 miles a year, the cost of service and damage done would be one-fourth ($\frac{1}{4}$) of the above. In both cases no allowance is made for speed.

Considering speed as a factor, the figures for automobiles would increase and for the horse-drawn traffic would decrease. There is no question that both classes of traffic receive benefits far in excess of the cost of service. The example chosen may represent heavier traffic and a more costly construction than the average. With lighter traffic and cheaper roads the ton-mile cost will tend to increase. Railroad experience leads to the same conclusion.

Now going back to our very rough estimates as to yearly expenditures, and as to increase in motor-vehicles, we should have at the end of five years of our construction a yearly outlay of about \$450,000,000. We should also have about 6,000,000 motor-cars. The horse-drawn traffic, as I have said, is unknown. In New Jersey it seems to approximate about 40% of the total. Remembering that New Jersey is pretty well automobilized, and that many vehicles use more than one horse, let us assume for our present purpose a total of 6,000,000 teams, or say 10,000,000 horses. (In 1914 there were 25,000,000 horses and mules on farms in the United States.) If the average automobile motor rates at 25 H. P. and we tax on H. P. basis at \$1.50 a unit, we should raise from motor vehicles \$225,000,000, and from horses \$15,000,000, a total of \$240,000,000, or almost 55% of our estimated outlay.

Enough has been said to outline roughly, indeed, the many and very serious problems suggested by a forecast of our road-work. The lesson to be drawn therefrom is the need of thorough organization of our road forces and of careful preliminary study. The interests affected are among the most important to the welfare of the nation. The investment will be gigantic in size, but can be made to return a benefit far beyond its cost if we will handle it as a business proposition. If, on the other hand, we rush into work of unparalleled magnitude without adequate preparation, if we continue to intrust its execution to men unskilled in the work, chosen mainly on account of past political services and lacking public confidence, and if we keep changing them as various parties may command popular pluralities, we shall pay the price of our folly.

Take Highways Out of Politics as Schools Were

To those acquainted with the political conditions affecting not only our roads, but our whole system of government, the remedy proposed may seem to belong to the land of dreams and ideals. I cannot see why what has been accomplished in removing our schools out of politics and in providing a trained staff and proper material, cannot also be repeated in the case of our roads. I will cheerfully plead guilty to any charge of being a "bull" on the prospects of these United States, and on the ability of my fellow citizens, to organize and put through any job from the Panama Canal up. If, however, I am wrong, if in work of such vital importance we cannot rid ourselves of political interference, if we cannot find ways to do the job thoroughly, it would seem that the time has come for us to admit that, however well our democratic system may have been suited to a small community living under the most simple conditions, it cannot provide the necessary government for a highly organized world power. This I, for one, am not ready to admit.

(The End)



What the Pennsylvania Railroad Is Doing to Prevent Grade Crossing Accidents

Intensive efforts are being made on the Pennsylvania System to prevent grade crossing accidents in connection with the national careful crossing campaign being conducted during the summer months under the auspices of the American Railway Association.

The object of this campaign is to bring to the attention of the American people the necessity for exercising the greatest possible care to avoid being struck and killed or injured by trains while traveling over highway grade crossings and to impress upon locomotive engineers, firemen, conductors and trainmen, track foremen, crossing

The Highwayman

watchmen and all other employes the necessity for doing everything within their power to prevent such accidents.

Approximately 140,000 posters illustrating a grade crossing accident have been distributed for posting along the Pennsylvania System. A million stickers showing a reproduction of the poster will be placed on correspondence sent out from the various offices of the railroad. Lantern slides also have been furnished to motion picture houses to call attention to the objects of the campaign on the screen.

Instructions to officers and employes of the Pennsylvania System state:

"Every available means should be employed to educate automobilists, drivers of other vehicles and foot travelers to avoid death or injury while traveling over highway crossings. At the same time no effort should be spared to see that railroad employes strictly obey the rules and regulations designed for this purpose.

"Thirty out of every hundred accidental deaths on the railroads of the United States in 1921 occurred at highway grade crossings. The fact that there has been no increase in grade crossing fatalities since 1917, is primarily due to the work of the national and local safety councils, safety education in the schools and to the extensive publicity given the safety first movement by newspapers and magazines.

"The checking of reckless driving of automobiles over highway crossings and sending notices thereof to the owners by the railroads has had marked effect in this direction, but the effort already put forth should not only be continued but should be increased to meet the conditions that are developing from day to day."

Special instructions have been issued to officers and assistants in charge of the various departments to check up the observation of safety rules and regulations. Attention of road foremen of engines, trainmasters and assistants, maintenance of way supervisors and others concerned in being called not only to the special rules relating to grade crossings governing train service employes but also to such things as unnecessary obstructions to the view of crossings, condition of the roadway at crossings and locomotive whistles and bells.

\$341,300,000	
Motor Vehicle Payments Into Public Treasuries in 1921	
FEDERAL	
1. Passenger Car Excise Taxes.....	\$64,388,000
2. Commercial Vehicle Excise Taxes.....	11,640,000
3. Parts, Accessories, Tires Excise Taxes.....	39,518,000
4. Common Carrier Tax on Passenger Cars for Hire†.....	1,776,000
	\$117,322,000
STATE	
1. License Fees.....	\$122,478,000
2. Personal Property Taxes*.....	75,000,000 (38 states and D. of C.)
3. Gasoline Taxes*.....	10,500,000 (15 states)
4. Miscellaneous Taxes*.....	5,000,000 (Motor Transportation Franchise Taxes; Mileage Taxes; Business Taxes on Manufacturers and Dealers.)
	\$212,978,000
MUNICIPAL	
1. Local License Fees*.....	\$11,000,000 (Wheel Taxes; Motor Fuel Taxes; Motor Transportation Franchise Taxes.)
	\$11,000,000
Grand Total - - - - -	
\$341,300,000	
*Conservative estimates based on careful analysis of factors involved. †Figure for fiscal year.	

Service to Builders of Good Roads

JOHN C. BRAHNEY

THE BOND MAN

20 Clinton Street, Newark, N. J.

'Phones Mitchell 1177-1178

SURETY
BONDS

LIABILITY
INSURANCE

Personal attention given to highway contractors
requiring surety bonds and casualty insurance



In front of Seaview Golf Club, near Atlantic City, (Route 4)

Warrenite—Bitulithic Pavements Have Stood Up Under Heavy Traffic For 15 Years

The test of the paving is in the riding—and the cost of upkeep.

Upon *either* of these points we invite your critical investigation.

Some of the oldest paved roads in New Jersey were laid under the Warren patents.

Many of these have been in constant use *under heavy traffic* for fifteen years. They are still in excellent condition.

"The Best Road You Can Buy Is the Cheapest in the End."

Warren Bros. Company

District Office 50 Church Street, New York City, N. Y.

The Delaware River Quarry & Construction Company

**Largest Producers of Crushed Trap Rock
in New Jersey**

ESTABLISHED THIRTY YEARS

Main Office: 21 Bridge Street, Lambertville, N. J.

Branch Office

National Bank Bldg., New Brunswick, N. J.

The Highwayman



NOT merely one improved highway, but a network of smooth, dustless, economical roads--this is "The Magic of Tarvia."

The Magic of Good Roads--

HALF a century ago the railroads reached out into the wastes of the continent—tapped reservoirs of undeveloped wealth—lifted the pall of isolation from frontier life.

Today improved highways are completing the work that the railroads then began—are doing for individual districts what the railroads did for the country as a whole.

The old-time "isolated community" is rapidly vanishing. In its stead are seen progressive towns and villages—centers of ever-widening circles of business activity. This is the magic of good roads.

Nor are the benefits confined to towns and villages. Good roads make farming more profitable. They bring

to the farmer and his family greater social advantages and better educational facilities. They make farm life more attractive.

Yet with all their blessings, good roads need not be expensive. Whether for residential streets or country highways, Tarvia is the quickest, surest most economical way to all-year roads, free from mud, dust and ruts and proof against water, frost and traffic. It is a coal-tar product made in grades to meet every road condition.

One Tarvia road in your community will prove to you and your townspeople how good roads, with all their benefits, can be had at low cost.

Illustrated booklets free upon request

Tarvia
For Road Construction
Repair and Maintenance

The *Barrett* Company

40 RECTOR STREET, NEW YORK CITY

C. A. Baker, Jr., . . . No. 323, Closter
H. M. Smith, . . . No. 96M, Riverton
C. C. Randolph, . . . No. 2466, Plainfield
Ashley Burner, . . . No. 2232, Plainfield

GLUTRIN

Four Reasons Why All Gravel Roads Should Be Treated With Glutrin

First: GLUTRINIZED gravel roads are hard ALL THE YEAR ROUND.

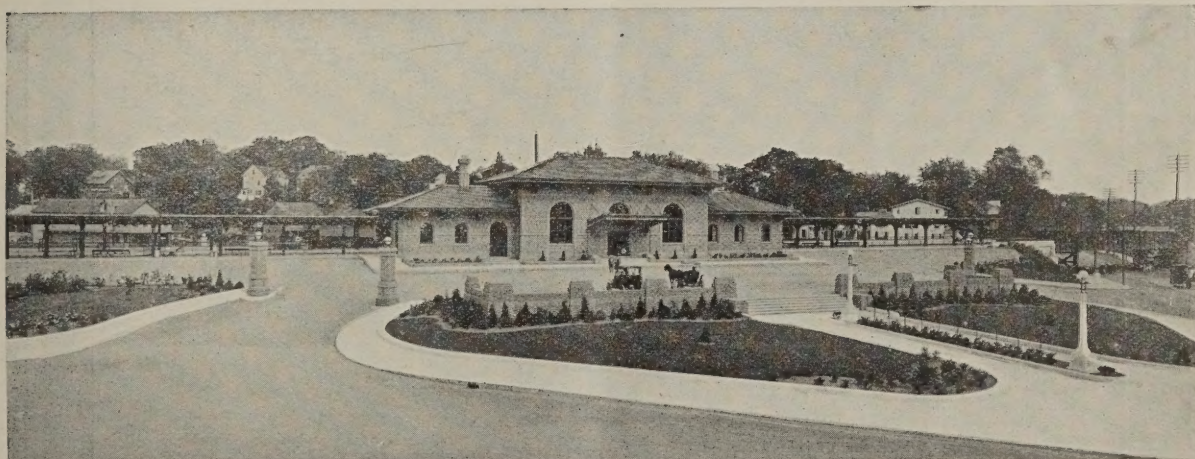
Second: GLUTRINIZED roads SHED WATER—and for that reason they do not rut up during the winter and Spring.

Third: Glutrin is the best BINDER yet discovered for gravel stone, sand-clay, or slag or earth roads.

And finally: Glutrin is not only the BEST binder, but by far the most economical.

Glutrin has been manufactured by us in our own plants for over 15 years. We have our own tank car line in which to deliver the product. The material used in New Jersey was applied by Mr. M. R. Young, Trenton, N. J., with pressure distributors especially built to handle this product.

Robeson Process Company
Fifth Avenue Building, 200 Fifth Avenue, New York



D. L. & W. R. R. Plaza, Morristown, N. J. Paved with Amiesite.

Ride on *Amiesite*

the economical and durable bituminous pavement. **ECONOMICAL** because it is easily laid and maintained. **DURABLE** because of its resilient and wear-resisting qualities.

Roads paved with Amiesite have withstood traffic for years without repairs.

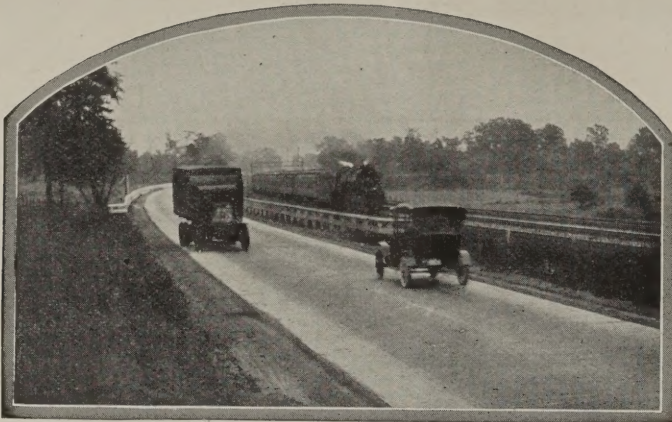
Our plants have a capacity of one-half million yards of pavement annually.

Manufactured by the

NORTH JERSEY AMIESITE COMPANY

MAIN OFFICE.
17 SOUTH ST., MORRISTOWN, N.J.

The Highwayman



(Courtesy Portland Cement Association)

When Vulcan Made 'em, They Lasted Forever

Vulcan was the blacksmith of the Gods on high Olympus.

The things he forged in his mighty smithy lasted forever.

Neither time nor tempest, age nor rust, could

destroy their everlastingness!

In that, they were similar to roads built of "Vulcanite"—the cement that is made in our giant plant at Warren Co., N. J., with its capacity of 2,000,000 barrels a year.

"Let's get together and talk Cement"

VULCANITE PORTLAND CEMENT CO.

PHILADELPHIA

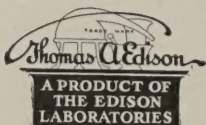
BOSTON

NEW YORK



Hamburg Avenue, Paterson, N. J.

Built by Gus J. Dreher, Paterson, N. J., 1921-1922



Edison Portland Cement
Used in the Construction of This Road

EDISON PORTLAND CEMENT CO.

NEW YORK

BOSTON

PHILADELPHIA

of New Jersey

19

SERVICE

SERVICE

IN USE SINCE 1889

 **Dragon**
PORTLAND CEMENT

STRENGTH and UNIFORMITY

For Information and Prices—Write

The Lawence Cement Co.

302 Broadway, New York, N. Y.

SERVICE

SERVICE

When the Traffic Cop Says "Stop"—

you can stop—if you're on a Concrete street.

The firm, gritty surface of Concrete pavement gives maximum cooperation to brakes and tires. It is skid-proof even in wet weather.

Concrete is clean, permanent, hole-proof—everything the public and the motorist desire. And people can get the kind of pavement they want if they insist.

*Our Booklet R-4 tells other interesting things
about Concrete Streets. Write for your copy.*



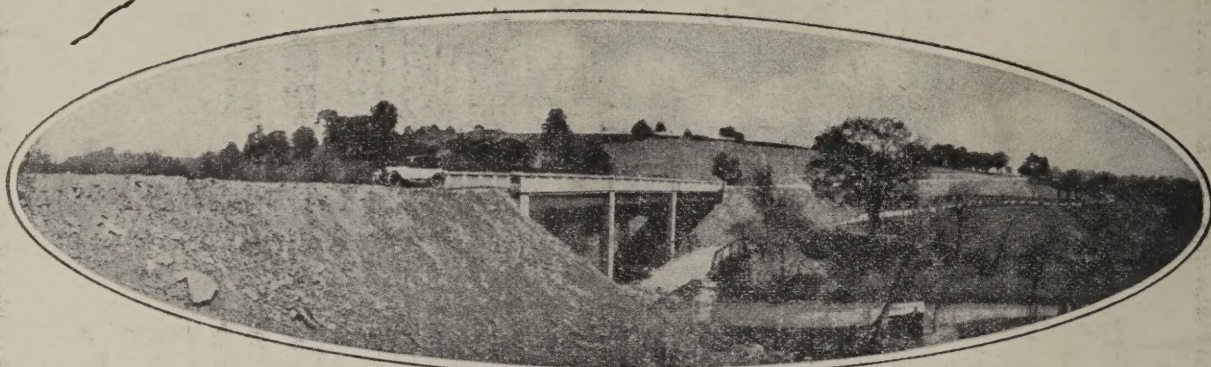
PORTLAND CEMENT ASSOCIATION

347 Madison Avenue, New York

A National Organization to Improve and Extend the Uses of Concrete

Offices in 23 Other Cities

ALONG THE ROAD



The roads that handled the traffic of yesterday are now absolutely inadequate. Look at the photographs above and notice the new road and bridge and the old section of the road and bridge which it has replaced. This is one of many recent improvements along the Lincoln Highway.

Lest We Forget

While we are going ahead with our improved road programs, let us not forget the charm of the old roads—the “shady lanes” we traveled with horse and buggy, in the good old days.

A hard surfaced road may be produced in a few weeks, but it takes years to produce shade. We should be thinking now about the planting of our new roads—and put that thought into action!

There are some pertinent thoughts in the following clipping, which has chanced to fall into our hands:

“Don’t Forget Trees”

Building good roads is a new industry in this country. As far as it has gone, it has benefits that cannot be estimated. But in some respects the country has lost something by these improvements, something of the rural beauty has been sacrificed when so many trees have been cut down in making the new roads. The old-time country dirt-roads are prettier now, even though they are not as comfortable to ride over.

Right here we want to suggest to Blue Island property owners the great value of planting trees about their premises, wherever there is a convenient and suitable place for one, or wherever one is removed by the elements. Trees are not like flowers—it takes a tree years to become of sufficient size to afford shade and beauty, and each year finds fewer and fewer of them. So, regardless of what happens along our roads as they are being improved, let us plant more trees about our property, not only for our own comfort and pleasure, but for the comfort and pleasure of the generations that will come after us.

A western evangelist makes a practice of painting religious lines on rocks and fences along public highways. One ran: “What will you do when you die?”

Came an advertising man and painted under it: “Use Delta Oil. Good for burns.”

“Really,” gasped the automobilist, bending over his victim, “really, I didn’t hit you intentionally.”

“Aw, go on,” returned the fallen one belligerently, “whatcher got that bumper on yer car for, if you don’t expect to go runnin’ into people?”

Beats the “Daily Dozen”

Doctor: Now that you have a car you must not neglect your daily exercise.

She: Oh, he won’t. It’s a second hand car.

When the butcher gets a new automobile delivery wagon, his customers all wonder nervously what he did with his old horse.

Some Operators Don’t Need ‘Em!

A Minneapolis subscriber visited one of the offices in that city and noticed the automatic dial in front of an operator. He was greatly interested and shouted to his friend across the room, “Hey, Bill, this girl has a speedometer on her board!”

